METHODS AND APPARATUS WHEREIN MULTIPLE, SIMULTANEOUS ENTRIES TO A SINGLE GAME OF CHANCE ARE ELIGIBLE FOR AWARDS BASED ON BOTH MATCHING AND NON-MATCHING SYMBOLS

FIELD OF THE INVENTION

The present invention relates generally to games of chance such as a lottery, lotto, or other game of chance, and more specifically to methods and apparatus for generating and processing entries to such games of chance.

BACKGROUND OF THE INVENTION

Gambling and games of chance represent a significant business in the US and in other developed countries. In the US alone, approximately 40 states operate lotteries, which generate over $30 billion of revenue each year. For many states, revenue from these lotteries has come to represent a significant income for the respective state budgets. In addition, gambling at casinos, racetracks and on reservations of Native Americans also represents a significant business, regulated and taxed at the state, federal or local level.

A typical state lottery system consists of a number of different games, including lotteries and lottery-style Games (e.g. "PowerBall"), bingo-style Games (e.g. "Keno"), as well as instant Games (e.g. "scratch Tickets"). A central authority, which is either directly run by the state or government licensed, operates the games and manages central operations. This central authority works with a number of resellers and authorized sales outlets (e.g. convenience stores, gas stations, liquor stores, etc.) with remote terminals. Resellers receive a commission on sales. The player of a lottery-style game generally visits one of those resellers to purchase a wager. A wager can consist of either specific numbers selected by the player (e.g. on sense mark forms), or through numbers randomly generated by a terminal on behalf of the player (often referred to as "Quick Picks"). Also the player can play individual wagers or multiple wagers at once in a combined entry (e.g. five PowerBall wagers in one entry). Furthermore, some states and some European countries allow

the player to purchase an entry (with one or multiple wagers), which is valid for a series of drawings.   These entries valid for multiple drawings are sometimes referred to as "subscriptions".   Finally, in some instances state lotteries and other operators of games of chance have implemented the possibility for players to purchase entries over the Internet.   Remote terminals at the sites of resellers are generally linked to a central server of the authority managing the game via a direct telecommunications link.   Any entry purchased at a remote terminal is usually communicated to the central server.   A confirmation (ticket) is printed locally.   Often, the ticket is identified with a unique number and a bar code.   This later allows the player to present the ticket at any relate outlet and find out if it was a winning entry.

One example of a typical lottery-style game is often referred to as "6/49", where six winning numbers are selected out of 49 possible numbers.   In this basic form, the odds of selecting the winning six numbers are 1 in 13,983,816.   Defining one of the six selections as a bonus number reduces the odds to 1 in 2,230,636.   Other possible games used in US state lotteries are 6 out of 53 (California), 6 out of 44 (Virginia) and 6 out of 54 (New York).   The payout of lottery-style games is calculated as total revenue, minus reseller commissions, state treasury duties, operating costs and possible charitable contributions.   In most lottery games, 3 matching numbers represent a small payout received by the payer.   This payout increases for 4 and 5 matching numbers.   But the most significant portion of the payout is usually reserved for 6 matching numbers (or 5 matching numbers with a matching bonus numbers).   This "jackpot" is usually progressive, i.e. if no player has six matching numbers in one drawing, the jackpot increases accordingly in subsequent drawings.

Some lottery-style games have offered "consolation awards." Examples include games of the Pennsylvania and Missouri state lotteries, but also lotteries organized by corporations such as banks for a limited number of customers or members.   Typically, these consolation awards represent an opportunity for an entry in a subsequent drawing or another game of chance, or an opportunity to win a non-cash award, such as a product offered by a promotional sponsor.   As such, these

consolation awards are generally considered as having a very limited "value" in the eyes of the players.   In some instances the consolation awards (or the opportunity to win them) are offered to all players (irrespective of whether the entry was a winning entry or not).   This would include lottery games with "coupons" for non-cash prizes on the back. In other instances, consolation awards are only offered to non-winning entries.   One example of the latter type of consolation award is a daily lottery game recently introduced by the UK national lottery.   The game consists of selecting 7 numbers from a list of 27. In this instance, if none of the 7 numbers selected by a player matches the winning 7 numbers, the player gets a free entry in the subsequent drawing.

Several systems exist to enable players to win (or have a chance to win) even if an initial entry did not result in a payout. U.S. Pat. No. 5,186,463 to Marin et al. teaches a system and method by which a lottery player may purchase a lottery wager, which is applied to multiple drawings until a jackpot award is awarded. U.S. Pat. No. 6,086,477 to Walker et al. teaches a system and process by which a lottery wager remains eligible for an award until it becomes a winning wager. In both systems, however, the ultimate payout is based on the odds of matching symbols.

U.S. Pat. No. 6,497,408 to Walker et al. teaches a system and method whereby players participating in a primary lottery drawing (e.g. through a plurality of wagers) may elect to participate in a second, or derivative lottery drawing (a "meta-game"). This patent mentions one embodiment where the odds of winning in this second game may be related to the odds of losing in the primary game. It does not, however, teach a system to provide payouts to both *matching* and *non-matching* entries in the *same* game.

In summary, to the best of the applicant's knowledge, all lottery-style games of chance provide payouts exclusively calculated based on the odds of *matching* a certain number of winning symbols. This makes sense, because payouts based on the odds of *non-matching* numbers would be uneconomical or too small to be attractive: the odds of selecting six numbers out of 49, where *none* of those six matches the winning six numbers of the drawing, are fairly high, and thus the

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potential payout necessarily fairly low. Not surprisingly, consolation awards given to *non-matching* entries (if any) are either small, or based on non-cash awards, or related to subsequent drawings, or to related games (or a combination of the above).

SUMMARY OF THE INVENTION

The present invention provides a method and system by which players participating in a game of chance (e.g. a lottery, lotto, bingo, or other game of chance) have a chance of winning an award based on either the number of *matching* symbols, or based on the number of *non-matching* symbols, all within the *same* game.

The odds of winning based on *matching* symbols are well known and used in practice in many US state lotteries and other games of chance. In a typical lottery-style game, the odds of selecting the correct 6 symbols out of 49 possible symbols in one individual wager are very small, and thus the corresponding award (jackpot) is very high — certainly attractive enough in the eyes of the players to encourage them to play the wager.

The odds of selecting six *non-matching* symbols out of 49 (i.e., the player selects six symbols and *none* of them corresponds to any of the six winning symbols) are fairly high if they are calculated based on *one individual wager*. Hence, no game of chance known to the applicant has offered a significant award based on the odds of *non-matching* symbols (other than consolation prizes and maybe the possibility of entering in a subsequent drawing). However, at the core of the present invention is the concept of considering *multiple, simultaneous wagers* as one joint entry. This dramatically changes the odds and enables the operator of the game of chance to offer an award based on the odds of *non-matching symbols*. An example would be somebody playing ten wagers simultaneously, each time picking 6 symbols out of a possible 49. The odds that *none* of those 60 symbols selected match any of the 6 winning symbols are fairly low, allowing for an award of significant value in the eyes of the players. The result would be an encouragement of players to participate to a

larger degree with simultaneous wagers, thus potentially increasing revenue for the operator of the game of chance.

In the preferred embodiment of the present invention, the option of playing multiple, simultaneous wagers already exists in many U.S. state lotteries and other games of chance through so-called "Quick-pick" entries of randomly selected entries. A lottery authority could therefore implement the method and system described in the present invention to compare all the entries of such a *joint* Quick-pick entry against the winning symbols, by adding an additional step – in addition to analyzing whether individual wagers on the entry contain *matching* symbols, based on the present invention the entire entry with all the selected symbols collectively would also be analyzed to identify the number of *non-matching* symbols. Furthermore, the operator of the game of chance could implement a scale of payouts and awards based on the number of simultaneous wagers played on a single entry (representing the relative odds). For example, no matching symbols on a five-wager Quick-pick entry would likely represent a fairly small award; no matching symbols on a ten-wager Quick-pick entry would represent a larger payout; and no matching symbols on a 25-wager Quick-pick entry could represent an even larger payout. Depending on the exact nature of the game (6 out of 49 or 54, with or without bonus number), the payout for *non-matching* symbols on a simultaneous 25-wager Quick-pick entry would be comparable to the payout for six *matching* symbols on an individual wager (all within the *same* lottery game).

In another embodiment of the present invention, the same methodology could be applied to multiple drawings. For example, a player purchasing (in advance) an entry of one individual wager, valid for ten subsequent drawings, could be eligible for an award based on *non-matching* symbols at the end of those ten drawings if *none* of his or her numbers match *any* of the winning symbols of the ten drawings. As in the above example, the entry of the player is eligible for winning awards both based on *matching* symbols (for each drawing individually) and based on *non-matching* symbols (for all ten drawings jointly). Again, as above, this system of awards based

on *matching* and *non-matching* selections could be introduced by the operator without actually introducing a new game of chance.

These and other advantages and features of the present invention will become apparent, and the nature of the invention may be more clearly understood by reference to the following detailed description of the invention, the claims and the drawings appended hereto.

BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 is a block diagram of a system and apparatus consistent with the present invention.

Fig. 2 is a block diagram depicting one embodiment of the controller shown in Fig 1.

Fig. 3 is a table illustrating an exemplary data structure of a price database, as shown on Fig 2.

Fig. 4 is a table illustrating an exemplary data structure of an Entries database, as shown on Fig 2.

Fig. 5 is a table illustrating an exemplary data structure of a Wagers database, as shown on Fig 2.

Fig. 6 is a table illustrating an exemplary data structure of a winning symbols database, as shown on Fig 2.

Fig. 7 is a table illustrating an exemplary data structure of an awards database, as shown on Fig 2.

Fig. 8 is a flowchart illustrating a set of steps for operating a game of chance consistent with the present invention.

Fig. 9 is a flowchart illustrating a set of steps for registering Entries to and payments for a game of chance consistent with the present invention.

Fig. 10 is a flowchart illustrating a set of steps for calculating awards in a game of chance consistent with the present invention.

Fig. 11 is a flowchart illustrating a set of steps for processing awards payouts in a game of chance consistent with the present invention.

Fig. 12 is a graphic illustration of the probability distribution of a traditional game of chance compared to the two-tailed probability distribution of a game of chance consistent with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Unless modified by other language or otherwise indicated herein, the following definitions apply. The term "game of chance" identifies a lottery in which (1) players select or are randomly assigned a number (n) play symbols, (2) a number of determinant play symbols are randomly drawn or selected under the direction of the party operating the lottery, and (c) the players are determined to be winners or losers according to the results of a comparison of the play symbols they selected or were assigned and the determinant play symbols drawn or selected under the direction of the party operating the lottery. The term "Game" means one playing or drawing of the game of chance. The term "Wager" means one bet (i.e., a player's selection or assignment of n play symbols) in the game of chance. The term "Entry" means one wager or two or more wagers played simultaneously by a player. The term "Ticket" means a tangible or electronic confirmation of an entry. The term "play symbols" means numbers but can also take other forms, e.g., letters, colors, shapes, pictures, etc. The term "player" means a party who participates by wagering in the game of chance.

A traditional game of chance, such as for example a U.S. state lottery game, provides payouts only based on the probability of *matching symbols*. In a typical "6 out of 49" lottery game, the player has to select 6 numbers out of a possible 49 (an individual Wager. The lottery operator then randomly draws 6 winning numbers. Given that the odds of matching 1, 2, 3, 4, 5, or 6 numbers decrease exponentially, the payouts associated with each of those win statuses increase exponentially as well. Providing payouts for the event of *non-matching symbols* is not economical for a single Wager. The odds of a player selecting 6 symbols in a single Wager, none of which ends up matching the 6 winning symbols, are fairly high. Consequently, the related payout is very low, in most cases too low to provide an incentive to play the

game of chance. In a preferred embodiment, the present invention overcomes this drawback by providing a system, method and apparatus whereby multiple simultaneous Wagers are considered as a combined entry (an "Entry"). While the odds of selecting *non-matching symbols* for a single Wager are fairly high, those odds decrease exponentially for Entries comprising 5, 10, 15, 20 or 25 Wagers. Thus, the operator of a game of chance can offer additional incentives to players, increase the likelihood that players will play multiple simultaneous Wagers, and increase overall participation.

While this document will often refer to U.S. state lotteries for the purposes of illustration, the present invention also relates to other games of chance where the player has to select a certain number of symbols (numbers, letters, colors, shapes, pictures, etc.) out of a given set of symbols.

Fig. 1 illustrates a block diagram of a system or apparatus consistent with the present invention. A central controller **20** is used to operate the game of chance. It is linked either directly or indirectly to a number of dedicated terminals **22**, as well as to a number of remote telecommunication devices **28**. Dedicated terminals can take the form of special lottery terminals, which most lotteries use today in retail outlets such as convenience stores or gas stations. They can also take the form of kiosks, automated teller machines, or other devices. In the example of a game of chance operated by a company or association for a limited number of members or customers, a dedicated terminal can also take the form of a bank counter, sales outlet, or simply a person dedicated to registering entries in verbal or written form.

In a preferred embodiment of the present invention, dedicated devices **22** will have means to input one or several Wagers in the game of chance, relaying those Wagers to the central controller **20**, receiving confirmation back from the controller, recording and/or processing a payment, and outputting a confirmation of the entry via for example a printer. Inputting Wagers can take the form of manually recording the symbols selected by the player, inputting the selections via a reader of sense mark form, randomly generating symbols on behalf of the player, or any other form. Some dedicated devices will only fulfill some of these functions, leaving the operator of the

resale outlet to handle others. Dedicated terminals generally also provide functions to check, after the drawing of winning symbols, whether an Entry is a winner, and process small awards payouts on behalf of the operator of the lottery.

Remote telecommunication devices 28 can take the form of personal computers, telephones, personal digital assistants, pagers, televisions, public Internet kiosk or other communication devices. Given that these devices are remote, payment for entries to the game of chance cannot be processed in cash, as it will be in the case of most transactions at dedicated terminals. Therefore, means to process remote payments (such as via credit cards, debits to authorized accounts, etc.) are necessary with the use of remote telecommunication devices.

Communications between the controller 20 and either dedicated terminals 22 or remote telecommunication devices 28 can occur via regular telephone lines, wireless communication, satellite, cable connections, dedicated telecommunication lines (e.g. T-1 lines), or any other means of communication. In another embodiment of the present invention, referring to a smaller game of chance organized by a private organization (such as a contest organized by a company, association or club), such communication can also be verbal or in writing.

Referring now to **Fig. 2**, an illustration is provided for one embodiment of the controller 20. This controller includes a processor 60, one or several memory devices such as a Random Access Memory (RAM) 62, a Read-Only Memory (ROM) 64, or other memory devices not shown here, one or several input devices 66, one or several output devices 68, one or several communications ports 70, as well as one or several data storage devices 80. The controller 20 can be implemented by using general purpose devices readily available in the market and appropriately programmed, by devising a dedicated hardware circuit, or by any other hardware and software combination. All the parts of the controller 20 may be located within a single device or computer, or they may alternatively be located in separate devices, linked to each other via direct communication lines (such as e.g. serial cables), or via indirect communication lines (e.g. telephone lines, Internet connections, etc.).

The processor **60** may take the form of one or several microprocessors well known to those skilled in the art. Ideally, the processor should be capable of handling large volumes of transactions and data. The instructions of the program **82** are read into main memory devices **62** and **64**. By executing the sequences of instructions of this program **82**, loaded into the main memory device **62** and/or **64**, the processor **60** performs the operations described in the methods of the present invention. One or several input devices **66**, such as a keyboard, mouse, touchpad, microphone and voice recognition software, electronic pen, sense mark form reader, or other device of like purpose is linked to the processor **60**. Also, one or several output devices such as computer screens, printers of various forms, etc. are operable to receive output from the processor **60**. Communications ports establish connections for input and output between the central processor **60** and dedicated and/or remote terminals **22** and **28**.

The data storage device **80** is central to the operation of the present invention. It may take the form of a personal computer, where the data storage device **80** is a magnetic hard disk contained in the same physical location as the processor **60**, memories **62** and **64**, etc. However, given the fact that large lotteries have to operate with significant volumes of data, a likely embodiment of the present invention would include one or several dedicated servers acting as data storage devices **80**. Data storage devices **80** rely on "computer readable medium", which can take multiple forms, including but not limited to: semiconductor memory, magnetic and optical storage disks (e.g. floppy disks, hard disks, CD-ROMs, DVDs), dynamic random access memory, memory chips, cartridges or sticks, magnetic tape, punch cards, or any other medium that can serve the purpose of providing instructions to the processor **60**.

In one embodiment of the present invention, the program **82** stored in the data storage devices **80** is loaded from a computer-readable medium (such as a magnetic hard disk) into the main random access memory **62** of the controller **20**, either via an external communication line (e.g., a dedicated telephone line or an Ethernet cable) or via a communication device internal to the computer (e.g. a system bus). The

processor 60 then retrieves and executes instructions from this program 82. The program 82 may contain a number of distinct modules, e.g. an operating system, a user interface module, a core transactional module, a database interface module, as well as device interface modules.

The data storage device 80 also functions as a storage device for a number of databases 84: the price database 86, the Entries database 88, the Wagers database 90, the winning symbols database 92, and the awards database 94. These databases 84 are described in further detail below, in the Figures 3-7.

As will be understood by those skilled in the art, a number of alternative arrangements may be implemented besides those depicted in the figures described above. For example, the program 82 and the databases 84 may be stored in separate, dedicated data storage devices. Also, the program 82 could be stored in either the Read-Only memory 64. Finally the databases 84 could be stored partially in the dedicated terminals 22, with a separate program providing regular updates and synchronization. Any of those alternate implementations provide embodiments of the present invention.

Referring now to **Fig. 3**, table **100** represents a preferred embodiment of the price database 86, as it is stored in the data storage device 80 (see Fig. 2). The table includes a number of records specifying the price to be paid for Entries depending on mainly two factors: the number of Wagers played simultaneously, and whether or not the Entry is eligible for awards based on "non-matching" selections. These prices and rules are set in advanced, and are published to the players of the game of chance.

Table **100** includes a number of fields **102** to **108**. A "price identification number" **102** (e.g., an alphanumeric code or a sequential numeric code) serves as a unique reference to each record in the database. The number of simultaneous Wagers played on one Entry **104** is one of the criteria used to determine the price. The indicator (yes/no) whether or not the Entry is eligible and entered for awards based on non-matching selections **106** is an additional criterion. Finally, the field "price" **108** defines the price to be paid by the player for the respective Entry.

The following examples illustrate one preferred embodiment of the present invention: A player playing one individual Wager cannot qualify for awards based on non-matching selection. The price to be paid for this individual Wager is therefore $1. Similarly, if a player plays 2, 3 or 4 simultaneous Wagers on one Entry, the operator of the Game of chance may still not allow these Entries to qualify for awards based on non-matching selections. Therefore, the corresponding prices for these Entries would be $2, $3, and $4. If a player plays 5 simultaneous Wagers on one Entry, the Entry may for the first time qualify for awards based on non-matching selections. In the example illustrated in Fig. 3, the operator of the game of chance decided to increase the price by $0.50 (from $5 to $5.50) for Entries that qualify for awards based on non-matching selections. The increased price reflects the increased odds of winning an award.

Alternatively, the operator could decide to leave the price for both options at $5 if the increased volume of participation more than offsets the additional awards paid out. Indeed, the price of an Entry can be expressed as the sum of the prices of all the Wagers included on this Entry, plus a "delta". And this delta can obviously be positive, zero, or even negative. A number of algorithms can be used to define this delta, or the prices of various Entries. Any of these algorithms will include at least the following key variables (and possibly more): (1) the odds of winning awards based on non-matching selections (these are constant and known to the operator), (2) the award levels set for non-matching selections (these are at the discretion of the operator), and (3), the likelihood of players increasing their participation by playing more simultaneous Wagers, and thus generating additional revenue for the operator. The latter is an experience value that the operator can analyze and track on an ongoing basis.

Whether or not the Entry does qualify for awards based on non-matching selections may depend on various criteria. The operator of the Game of chance could, for example, decide that only randomly generated Entries (often referred to as Quick-pick Entries) qualify. This eliminates the opportunity of players strategically selecting play symbols in order to increase their odds. For example a player that

enters five simultaneous Wagers on one Entry, selecting the same six symbols in all five Wagers, has better odds of winning an award based on non-matching symbols than a player with five Wagers on one Entry where all symbols are randomly generated. Also, the operator of the game of chance may allow the players to select whether or not they want their Entry to qualify for awards based on non-matching selections (e.g. with an additional sense mark entry). For any Entry of five or more Wagers played simultaneously, the option of qualifying for awards based on non-matching symbols exists, and each time the respective price may or may not depend on whether or not the Entry does qualify (e.g. price identification number 7 and 8).

It is understood by those skilled in the art that the schematic illustration of the database table presented herein is exemplary only, and a number of other arrangements may be employed besides those suggested above, if they achieve the same effect of defining a price to be paid by the player for an Entry based on different criteria. For example two separate tables could result in the same effect, whereby one table identifies the base price to be paid, based on the number of simultaneous Wagers (e.g. $5 for five Wagers), and a second table identifies a "delta" to be applied if an Entry is eligible and entered for awards based on non-matching selections (e.g. $0.50 for entries between 5 and 9 simultaneous Wagers, $0 for entries with 10 simultaneous Wagers or more).

Referring now to **Fig. 4**, table **150** represents a preferred embodiment of the Entries database **88**, as it is stored in the data storage device **80** (see Fig. 2). The table includes a large number of records for each drawing of the game of chance, storing data associated with each Entry that is important for tracking the Entry and for calculating awards to be paid. Table **150** includes a number of fields **152 to 180**. A "ticket identification number" **152** (e.g., an alphanumeric code or a sequential numeric code) serves as a unique reference to each record in the database. The "drawing identification number" **154** associates each Entry to one or several drawings. This field may, for example, take the form of a date or other alphanumeric code. While most Entries in traditional U.S. state lottery games are associated with one individual drawing, the possibility of "subscription based" Entries for multiple drawings also

exists (e.g. an Entry is purchased in advance, with one or several Wagers, valid for the next five drawings). In this case, an alphanumeric code would provide a reference to multiple dates contained in a separate table.

The "sales date and time" 156 as well as the "selling terminal identification number" 158 allow the operator of the game of chance to track Entries. These fields can be used to calculate sales commissions, track collections of prices paid, etc. The "number of Wagers on the Entry" 160 stores how many individual Wagers the player entered simultaneously on one Entry, whereby an Entry can represent multiple Wagers selected on a sense mark form, or multiple Wagers played simultaneously on a Quick-pick Entry, or any other form. The field "entered for non-matching awards" 162 is a yes or no indicator. For example, depending on the rules set by the operator of the game of chance, an entry with five simultaneous Wagers may only qualify for awards based on non-matching selections if they are randomly generated. The "price paid for the Entry" 164 is generated from the table 100 (see Fig. 3), or through an algorithm linked to table 100. A field for "customer contact information" 166 may allow the operator of the game of chance to collect information regarding the customer, for example an e-mail address for Entries generated over the Internet. Alternatively, this field may be substituted by a number of separate fields, each serving the purpose of specific contact information such as name, first name, street address, city, telephone number, credit card number, driver's license number, e-mail address, etc. In the field "all symbols on Entry" 168, the system stores all the symbols (e.g. numbers) selected by the player (or randomly selected on behalf of the player) of all the Wagers associated with a given Entry. Duplicate symbols (e.g. numbers) are stored only once in this field. This field is populated through a reference to the Wagers database 200, which will be described in further detail below.

The field "awards for matching selections" 170 stores the sum of all awards earned with individual Wagers associated with this Entry. Again, this field is populated through a reference to the Wagers database 200 described in further detail below. The field "awards for non-matching selections" 172 is central to the

functioning of the present invention. Once all records are stored in the Entries database **150**, and once the drawing has been closed and the winning symbols have been defined, then the system described in the present invention compares the symbols of each Entry (field **168**) to the winning symbols (in the winning symbols database **250**, field **254**, further described below). If *none of the symbols in field 168 match the symbols in field 254*, then the systems stores in field **172** the award as defined in the awards database table **300**, field **308** (described in further detail below).

The field "total awards" **174** provides a simple addition of fields **170** and **172**. This is the total award to be paid to the player upon presentation of the confirmation ticket. The "payment identification number" **176**, the "paying terminal identification number" **178**, and the "payment date and time" **180** allow the operator of the game of chance to track payments of awards, providing a basis for the necessary operating procedures (e.g. accounting for remaining open claims, processing of collections from and payments to sales outlets, etc.).

Referring now to **Fig. 5**, table **200** represents a preferred embodiment of the Wagers database **90**, as it is stored in the data storage device **80** (see Fig. 2). This table includes a large number of records for each drawing of the game of chance, storing data associated with each Wager. There exists a "one-to-many" relationship between the Entries database table **150** and the Wagers database table **200**, since each record in table **150** (i.e. each Entry) is related to one or several records in table **200** (i.e. one or several Wagers).

Table **200** includes a number of fields **202** to **212**. A "Wager identification number" **202** (e.g., an alphanumeric code or a sequential numeric code) serves as a unique reference to each Wager stored in the database. The "Entry identification number" **204** corresponds to the "Entry identification number" **152** in the Entries database **150**, thereby creating a one-to-many relational link between the tables **150** and **200**, as described above. The "drawing identification number" **206** associates each Entry to one (and only one) drawing. In many cases, the field **206** will correspond to field **154** in table **150**. There are exceptions, however. One such

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exception is the example of a "subscription based" Entry, purchased with, e.g. two Wagers, valid for the five next drawings of a game of chance. In this example, the system will store ten separate records in table 200, for each of the two Wagers associated with each of the five drawing identification numbers. As in table 150, field 206 in table 200 may for example take the form of a date or other alphanumeric code. In the field "symbols" 208, the system stores all the symbols (e.g. numbers) selected by the player (or randomly selected on behalf of the player) for the respective Wager. Data in this field is used to populate the field 168 in table 150. The fields "matching award" 210 and "payment identification number" 212 remain empty at the time of registration, and are only populated with data once the drawing is completed. This process will be explained in further detail below.

Referring now to **Fig. 6**, table 250 represents a preferred embodiment of the winning symbols database 92, as it is stored in the data storage device 80 (see Fig. 2). This table includes a limited number of records, i.e. one for each drawing of the game of chance. Table 250 includes a number of fields 252 to 256. A "drawing identification number" 252 (e.g. date reference, an alphanumeric code, or a sequential numeric code) serves as a unique reference to each drawing of the Game of chance. This same drawing identification number is used in the field 154 of the Entries database and in field 206 of the Wagers database, thereby linking each record in these database tables to a specific drawing. The fields "winning symbols" 254 and "bonus symbol" 256 are used to store the winning symbols of each drawing. Depending on the structure of the game of chance, one or several fields may be used to best store this information (some games have bonus numbers, some don't).

Referring now to **Fig. 7**, table 300 represents a preferred embodiment of the awards database 94, as it is stored in the data storage device 80 (see Fig. 2). This table includes a limited number of records: for each drawing a certain number of win statuses exist, and each win status has an award allocated to it. These awards could always be the same, or they could change depending on the drawing. For example, in most US state lotteries, the award for three matching numbers in a game of "6 out of 49" is likely to be a fixed dollar amount. However, the award for six matching

numbers will generally depend on the bonus pool accumulated at the time of the drawing.

Table 300 includes a number of fields 302 to 308. A "drawing identification number" 302 (e.g., an alphanumeric code, or a sequential numeric code) serves as a unique reference to each award of the game of chance, providing a link to table 250. The "win type" 304 is a central element of the present invention, whereby each drawing offers multiple possibilities to win based on either matching selections (for a single Wager) or non-matching selections (for multiple simultaneous Wagers in one Entry). This field defines those two options. The field "win status" 306 defines multiple possible win statuses for each win type. For example, in a traditional US state lottery game of 5 out of 49 plus bonus number, win statuses (for matching selections in individual Wagers) are likely to be 2 matches + bonus number, 3 matches, 3 matches + bonus number, 4 matches, 4 matches plus bonus number, 5 matches, as well as 5 matches plus bonus number (i.e. the jackpot). For each of these win statuses, the operator of the game of chance defines the award in field 308. This award can be fixed for each drawing (as will be likely the case for smaller award sums), or it can depend on the overall participation (as is generally the case for the jackpot in the example of U.S. state lotteries). Note that in other types of games of chance, awards may be monetary or non-monetary, and may take the form of cash, credit, coupons, certificates, merchandise, services, etc.

Referring now to **Fig. 8**, a flowchart is provided to illustrate the method and process steps necessary to operate a game of chance in accordance with the present invention. According to one embodiment of the present invention, a player initiates the process – as illustrated in step 352 - by purchasing an Entry to the Game of chance, and paying for this Entry (either at a dedicated terminal 22 or via a remote device 28). The operator of the game of chance then registers this Entry in its central data storage device 80. The process of purchase, payment and registration is illustrated in further detail in **Fig. 9**. An Entry to the Game of chance consists at a minimum of one Wager (e.g. one selection of 6 symbols out of a possible 49), but it can include a multitude of Wagers on one Entry. Whether or not this Entry is eligible

and entered for awards based on non-matching selections depends on the criteria set by the operator of the game of chance. Such criteria could include, among others: purchase of a minimum number of Wagers, random selection of play symbols, Wagers have to be purchased simultaneously, or other criteria.

Once all Entries have been duly registered, based on a deadline for a given drawing set by the operator of the game of chance, the winning symbols are drawn (step 354). These winning symbols are stored in the winning symbols database 92, specifically in fields 254 and 256, linked to a specific drawing identification number 252. The winning symbols are published in various ways, in order to communicate with the players, allowing them to compare their entries with the winning symbols. This publication can take the form of newspapers, radio, television, Internet or other media (e.g. in the case of U.S. state lotteries), or it can take other verbal or written forms (e.g. in the case of a local association organizing a game of chance among a limited number of members).

After the closing of the drawing and the identification of winning symbols, an awards analysis is performed (step 356). The winning symbols are compared to the symbols registered for all Entries (in the Wagers database 90 and in the Entries database 88). Those Entries that qualify for an award are appropriately identified, and the win status and awards earned are stored in the respective fields and records of those two database tables (fields 210, 170 and 172). In accordance with the present invention, the total award stored in the Entries database 88 (field 174) will represent the sum of all awards based on matching selections (for all individual Wagers contained in this Entry), as well as the award based on non-matching selections (for the combined Entry). Step 356 is illustrated and defined in further detail in Fig. 10.

Finally, as illustrated in step 358, a player can check on the win status of his or her Entry and claim the respective award, and the operator pays out the respective award earned, if any. With the sum of all awards for any given Entry stored centrally in the Entries database 88, the system and process described in the present invention will automatically identify the total award earned for a given Entry, whether

it is based on matching selections in individual Wagers or on non-matching selections for the entire Entry. Step 358 is described and defined in further detail in Fig. 11.

Referring now to **Fig. 9**, a detailed description of the process steps necessary to purchase, pay for, and register entries to a game of chance, in accordance with the present invention, is provided. A player wishing to purchase an Entry to a game of chance can do that either at a dedicated terminal 22 or through a remote telecommunication device 28. The player communicates to the terminal or device the various parameters of the Entry he wishes to make, including but not limited to: number of simultaneous Wagers to be played, drawing (e.g. date), play symbols selected (whether individually identified or to be randomly selected by a system on behalf of the player), etc. At this point, the player also selects whether or not he or she wants the Entry to qualify for awards based on non-matching selections (alternatively, the operator of the game of chance may define certain criteria that – if fulfilled – automatically enter the Entry for such awards). The dedicated or remote terminal establishes communication with the central controller 20 (step 402), and the central controller 20 receives a request to purchase an Entry of at least one Wager (step 404), including the parameters described above.

At this point, the central controller 20, by running the program 82, performs a number of checks: First, in step 406, the central controller analyses whether the requested Entry consists of multiple Wagers on one Entry. If the answer is no, the controller proceeds to step 414. If the answer to the above question is yes, however, then the central controllers analyzes in step 408 whether the Entry qualifies for awards based on non-matching selections for the entire Entry. In some instances, this step can be left out. For example, the operator of the game of chance may decide that all entries with five or more Wagers on a Quick-pick Entry qualify automatically for such awards. If the answer to step 408 is no, the central controller again proceeds to step 414. If the answer is "yes", then the central controller analyzes in step 410 whether the Entry has indeed been entered for awards based on non-matching selections for the entire Entry. Again, this step can be left out – the operator of the game of chance may have decided that all Entries that qualify for non-

matching awards are automatically entered for such awards. Alternatively, the operator may require the player to identify whether or not he or she wants to enter (e.g. through an additional sense mark on a lottery form), which may also affect the price of the Entry. In this case the central controller would analyze this selection here in step **410**. If the answer to step **410** is "no", then the central controller proceeds to step **414**. If the answer is yes, however, the central controller in step **412** will identify the price (or additional charge or discount) for such a combined Entry from the price database **86**, field **108**. The series of checks performed in steps **406** to **410** will provide the necessary criteria (**104** and **106**) to find the right record in database **86**.

Based on the above information, the central controller in step **414** verifies that all Entries are valid. This may for example include a crosscheck to validate the seller terminal identification number, making sure that there are no missing symbols, making sure that the Entry is indeed entered before the drawing date and time, etc. In step **416** the system stores all the payment and registration information in the Entries database **88** and the Wagers database **90**. In the Entries database **88**, the system first creates a record in table **150**, allocating it a Ticket identification number **152**, and storing all related information, available at this point (i.e., fields **154** to **164** or **166**). Then, the system creates one or multiple records in the Wagers database **90**, table **200**, linking those records for Wagers to the record previously created in table **150** for the combined Entry through a common Ticket identification number (**152** which equals **204**). For each Wager record, the system stores in **208** the symbols as selected (manually or randomly) by the player. Once the system has stored a number of records in table **200** equal to the number of Wagers on the Entry (field **160**), the program combines all the play symbols stored in **208**, and stores all those play symbols in field **168** of the record with the same Ticket identification number (**152** which equals **204**). The fields **210** and **212** of the Wagers database **90**, as well as the fields **170-180** of the Entries database **88** remain empty until the drawing of the winning symbols and the awards analysis.

Once all the registration information has been properly stored (step **416**), the central controller proceeds to step **418** and issues a registration confirmation to the

player with the ticket identification number. This registration confirmation may take the form of a printed ticket in a U.S. state lottery, an electronic message, a phone call, a dynamic web page sent to a player who participates in a game of chance over the Internet, or any other form that allows the player to document that he or she has made an Entry and what this Entry is (i.e. which play symbols were selected). The ticket identification number on this registration confirmation may take the form of a number or alphanumeric code, which may or may not be machine readable. It may also be printed as a bar code or any other method of codifying a unique identification number for an Entry.

Referring now to **Fig. 10**, a detailed description of the method and process steps necessary to perform an awards analysis in accordance with the present invention is provided. Once a given drawing of a game of chance is closed, and the operator of chance has identified the winning symbols for this drawing, the central controller **20**, by running the program **82**, receives and stores the winning symbols in the winning symbols database **92** (step **452**). In the next step (**454**), the controller then accesses the Wagers database **90**, and identifies all the individual Wagers for this drawing, based on the drawing identification number stored in field **206**. In step **456**, for each of those individual Wagers records, the play symbols stored in field **208** are compared to the winning play symbols for the drawing, as stored in field **254** and **256**. In step **456**, the controller analyzes each Wager record to determine whether or not the record earns an award based on matching selections.

If there is a match between the two sets of symbols that meets one of the criteria set in the awards database **94**, the controller stores the respective award in the Wagers database record (step **458**). An example illustrated in **Fig. 7** may prove helpful: The controller is at this point looking for matching selections (i.e. records of individual Wagers with play symbols that match the winning play symbols), therefore only awards of the type "matching selection" (as defined in field **304**) apply. Assume one of the records in the Wagers database **90** has two matching symbols, plus a third symbol that matches the winning bonus symbol. This situation corresponds to one of the criteria set in the awards database in field **306** (the first line illustrated in **Fig. 7**).

The controller then identifies from the corresponding record in the awards database that this Wager qualifies for an award of $2 (as defined in field **308**). It will go back to the Wagers database **90** and store this award amount of $2 in field **210** of table **200**. If in step **456** none of the play symbols match the winning play symbols, or – more precisely - if the number of matches does not correspond to one of the criteria defined in the awards database (field **306**), then the controller proceeds to the next Wager record, and ultimately to step **460**.

Once this awards analysis has been performed for each Wager record (steps **454** to **458**), a similar set of steps is performed for all Entry records (steps **460** to **464**). The controller accesses the Entries database **88**, and identifies all the Entry records for this drawing, based on the drawing identification number stored in field **154** (step **460**). In step **462**, for each of those Entry records, the combined play symbols stored in field **168** are compared to the winning play symbols for the drawing, as stored in fields **254** and **256**. The controller analyzes each Entry record to determine whether or not the record earns an award based on non-matching selections. If there is a "match" (or rather a "non-match") between the two sets of symbols that meets one of the criteria set in the awards database **94**, the controller stores the respective award in the Entries database record (step **464**).

Again, an example illustrated in **Fig. 7** may prove helpful: The controller is at this point looking for non-matching selections (i.e., records of combined Entries with play symbols that do *not* match any of the winning play symbols); therefore only awards of the type "non-matching selection" (as defined in field **304**) apply. Assume one of the entries in the Entries database **88** consists of ten individual Wagers, and not a single symbol selected in any of these ten Wagers matches any of the winning symbols of the drawing. This situation corresponds to one of the criteria set in the awards database in field **306** (the last line illustrated in **Fig. 7**). The controller then identifies from the corresponding record in the awards database that this Entry qualifies for a non-matching award of $50 (as defined in field **308**). It will go back to the Entries database **88** and store this award amount of $50 in field **172** of table **150**. If in step **462** one or more of the play symbols match the winning play symbols (i.e.

the Entry does not fulfill any of the criteria defined in the awards database, field **306**,

then the controller proceeds to the next Entry record, and ultimately to step **466**.

Once this awards analysis has been performed for each Entry record, in step
466 the controller will once again go through all the records in the Entries database
88 which correspond to the present drawing identification number, and will calculate
for each record a total award for the Entry. This occurs in two steps: First, for each
Entry record, the controller will look up in the Wagers database **90** all corresponding
Wagers records that have the same ticket identification number (field **204**
corresponding to field **152**), will add up the total matching awards for all these
individual Wagers (from field **210**), and will store the sum in the Entries database,
field **170**. Second, the controller will add up the numbers stored in fields **170** and
172, and store the total in field **174**.

Referring now to **Fig 11**, a detailed description of the method and process
steps necessary to process an awards payout in accordance with the present
invention is provided. In the example of a U.S. state lottery, checking the win status
can occur either by comparing the symbols selected to the winning symbols
published in the media (newspaper, radio, television, Internet or other). Or the player
can present his or her Entry confirmation to an authorized reseller (e.g. a
convenience store). A dedicated terminal **22** of the authorized reseller, or a remote
terminal **28**, will establish a communication with the central controller (step **502**). The
central controller then receives a request to determine the win status and potential
payout of an Entry to this game of chance (step **504**). The Ticket identification
number of the Entry presented at the point of sale is communicated to the central
controller, and in step **506**, the controller locates the corresponding Entry record in
the Entries database **88**. Field **174** of this database contains a total award earned for
this Entry (including both awards based on matching selections for individual Wagers
and/or an award based on non-matching selections for the Entry as a whole). In step
508, the controller analyzes this Entry record to determine whether or not the record
earns an award. If there is an award still to be paid out for this entry, the controller

will issue payment instructions to the reseller at the authorized point of sale (step 512).

In the case of a U.S. state lottery, the reseller will issue the payment to the player, and in a further communication between the dedicated terminal and the central controller (step 514), information relating to the payment is communicated back to the central controller and stored in the Entries database 150. This information could, for example, include payment date and time (field 180), the paying terminal identification number (field 178), as well as a payment identification number itself (field 176). If in step 508, the controller determines that the Entry presented at the point of sales has not earned any awards, the reseller at the authorized point of sales is instructed to inform the player (or ticket holder) that the Entry presented is not a winner.

In the example of a U.S. state lottery, the operator will often define a payout threshold. Awards below that threshold may be paid out by resellers at authorized points of sale. For awards above this threshold, the operator has to be contacted directly. In other examples (e.g. in the case of a local association organizing a game of chance among a limited number of members), all entries will be presented immediately to the operator of the game, and payouts (whether monetary or not), will be done at that point.

Fig 12 provides a graphic illustration of the one-tailed probability distribution of a traditional game of chance, compared with the two-tailed probability distribution of a game of chance consistent with the present invention. Graph 550 illustrates the probability of matching 1, 2, 3, 4, 5 and 6 symbols in a traditional "6 out of 49" lottery Wager. For each individual Wager, the odds of matching one symbol are fairly high, while the odds of matching all six symbols are extremely low. Correspondingly, the payouts are initially 0, but increase exponentially. It is important to note here that the probability distribution is one-tailed. A game of chance operated in accordance with the present invention, however, has a two-tailed probability distribution (as shown on Graph 552): The odds of matching 1, 2, 3, 4, 5 and 6 symbols in an individual Wager remain intact (right portion of the curve). In addition, each player who participates

with multiple Wagers simultaneously on one Entry also has a probability of winning based on non-matching selections (left portion of the curve). Similar to above, the odds of have no single matching symbol on an Entry of one Wager are fairly high. However, these odds decrease rapidly, and for an Entry consisting of 20 to 25 simultaneous Wagers, they are extremely low. This allows the operator of the game of chance to offer potentially significant additional payouts based on the number of Wagers played, thus potentially increasing participation in the game.

It is to be understood and appreciated that the invention is not limited to the particular embodiments herein disclosed and illustrated, but comprises modifications and other embodiments obvious to persons skilled in the art that are within the scope of the following claims.